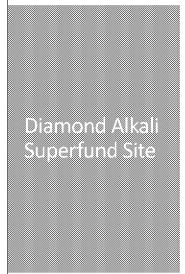
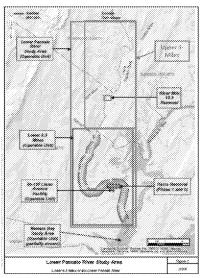
Lower Passaic River:
A Plan to Expedite Cleanup of the
Upper 9-Miles
December 1, 2017

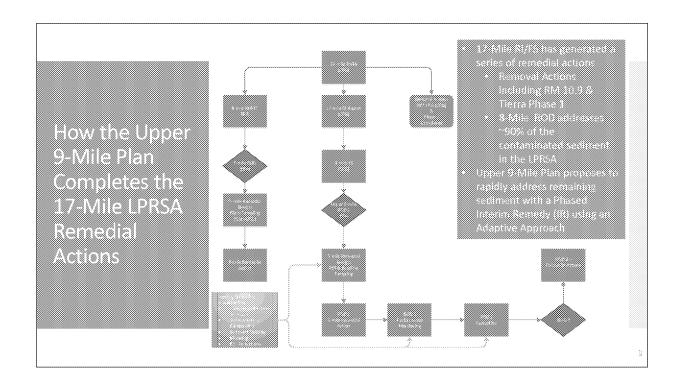
**CSTAG** Presentation



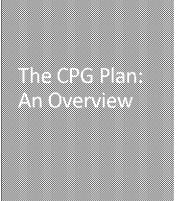


- OU1 80-120 Lister Avenue Facility
  - Addressed by the 1987 ROD; completed in 2004
  - Interim containment remedy, which consists of capping, subsurface sturry wall and flood wall, and a groundwater collection and treatment system
- OU2 Lower 8.3 Miles of the Lower Passaic River Study Area
   March 2016 ROD selected a remedy to address the sediments of the lower 8.3 miles
  - Most contaminated segment of the river and a primary ongoing contaminant source to the rest of the LFR and Newark Bay.
- OU3 Newark Bay Study Area RI/FS
- 1 OU4 17-mile Lower Passaic River Study Area
  - y Area
    Upper 9-mile Plan proposes a phased
    remedy to rapidity address sediment
    through a interim remedy that relies on
    adaptive management
  - Includes completing the 17-mile RI Report and an FS that evaluates Upper 9-mile remedial alternatives and acknowledges the Lower 8-mile ROD

There are 4 OUs associated with the Diamond Alkali Superfund Site OU4 is entire 17-mile LPRSA including the Upper 9-miles OU2 is the Lower 8-miles of the LPRSA and has been addressed by the March 2016 ROD Upper 9-Mile Plan would address the remainder of the 17-mile LPRSA employing a Phased Remedy using EPA's Adaptive Management process



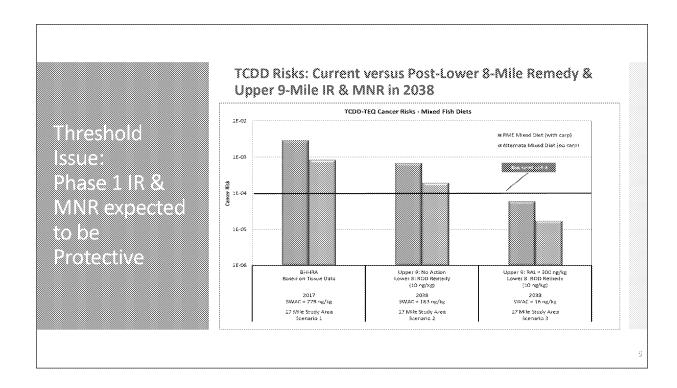
17-Mile LPRSA RI/FS has resulted in a series of remedial actions including 2 removal actions, 8-mile ROD Upper 9-mile Plan will address the remainder of the 17-Mile LPRSA through an active Interim Remedy, Post-Remedy Recovery with Performance Monitoring employing adaptive management. If RAOs are met then, a final ROD will issued. If RAOs are not met, the additional actions will be evaluated and implemented



Using Adaptive Management in the Upper 9-Miles

- ROD 1 Interim Remedy (IR) to remove Source Areas
   Posing the Greatest Risks or Preventing the Rest of the
   River from Recovering (ROD 1)
  - 2,3,7,8-TCDD Sediment SWAC reduced by ~90% following Phase 1 IR
  - Total PCBs reduced below background
- Monitor Fish, Crab, Water and Sediment to Confirm the IR & Monitored Natural Recovery (MNR) are Working (Performance Monitoring)
  - $^{\circ}$  Model projections suggest that fish consumption risks reduced to below 10  $^4$  in ~10 years
  - An estimated reduction of 90% for fish and avian ecological HQs in the same period
- ROD 2 Go Back Into the River and Do More if Needed or Set Final Cleanup Levels if River is Recovering as Predicted

żş



This figure shows the projected reduction in dioxin fish consumption human health risk from implementing the Lower 8 Miles ROD remedy and the Phase I interim remedy proposed for the Upper 9 Miles.

The basis of these estimates will be discussed later in the presentation, but the key point is that implementing the combined remedies for the Lower 8 and Upper 9 Miles is projected to achieve fish consumption cancer risks that are below the NCP target risk level of 10-4.

The above estimates reflect mixed fish species exposed to a whole-river sediment average; they will be revised to reflect the exposure likely from the species specific home range when the models are finalized.

CPG's Proposal for an Upper 9-Mile Phase 1 IR

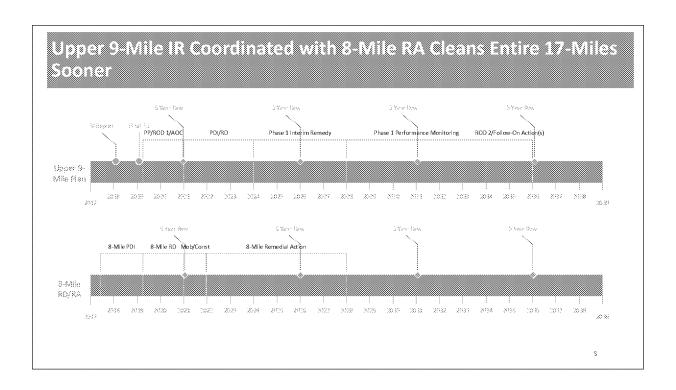
- Phased approach to address the Upper 9-Miles using Adaptive Management
- Proposed RAL of 300 ppt (ng/kg) TCDD and 1 ppm (mg/kg) of Total PCBs
- \* Approximately 80 Acres from RM 8.3 to RM 14.7
- · Remedial Footprint will be reassessed after the PDI
- RD will include refined modeling projections for sediment and tissue recovery
- Performance Monitoring will be used to determine whether the Phase 1 IR and MNR are sufficient and ROD 2 can codify the final cleanup levels, or whether additional actions are required to achieve protectiveness

3

Potential Results of the Upper 9-Mile Plan – Phase 1 IR & MNR

- Proposed Phase 1 IR & MNR are likely to achieve protectiveness when combined with Lower 8.3 Mile Remedial Action (RA)
- Allows coordination with Lower 8-mile
- The entire 17-miles will be addressed years sooner potentially completing the active clean-up in the mid-to-late 2020s:
  - \* Lower 8.3-Mile RA
  - \* Upper 9-Mile IR
- Iterative nature of Adaptive Management provides certainty of meeting final risk goals

7



The Upper 9-Mile Plan will expedite the cleanup of the entire LPRSA and coordination with the Lower 8-Mile ROD provides the opportunity to complete the active remediation in the mid-to-late 2020s

Conceptual Site
Model Elements
Regarding
Sediment
Recovery Provide
Guidance for
Phase 1 Interim
Remedy

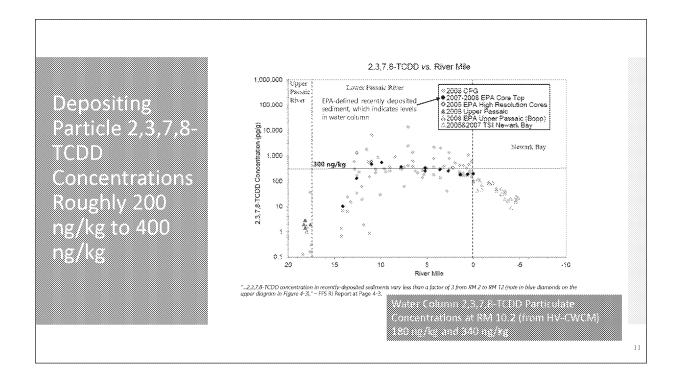
- \* At locations of fine sediment with surface concentrations much higher than on depositing particles:
  - Net deposition responsible for the COPCs being there in the first place has likely slowed or stopped
- At locations of fine sediments with surface concentrations matching those of depositing particles:
  - · Net deposition likely has continued
- At locations of coarser sediments, which typically have concentrations lower than those of depositing particles:
  - Concentrations likely reflect the net result of erosion and deposition of the fine fraction
  - Erosion and deposition at these locations will cause concentrations to be impacted by the concentrations on depositing particles

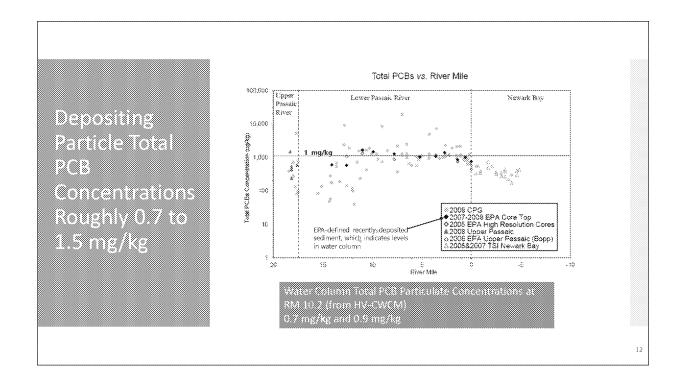
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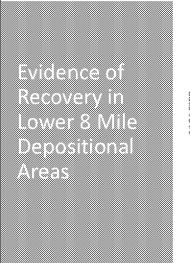
Upper 9-Mile Plan Phase 1 IR - Basis

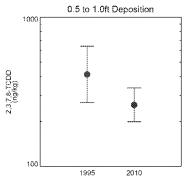
- Actively remediate sediments that inhibit recovery
- Allow areas with good recovery potential to respond to the substantial reduction in concentrations achieved by remediating source areas
- \* Areas subject to significant net deposition and areas subject to cyclic erosion and deposition have the potential for recovery and have COPC concentrations that reflect the concentrations on recently deposited sediments originating from the water column

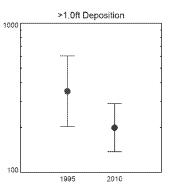
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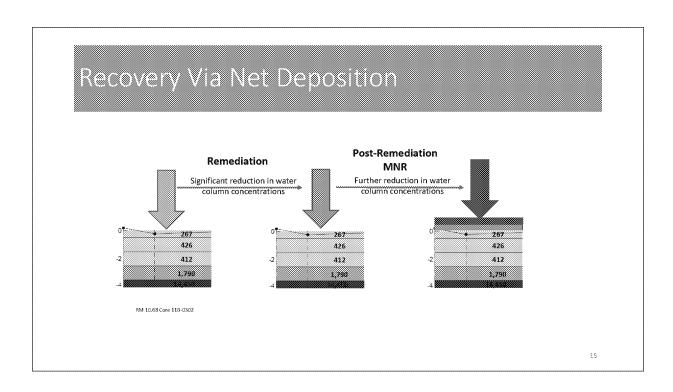
Plot shows the arithmetic average calculated in natural log pasce with +/- two standard errors for data collected between RM 1 and RM 7. The 1995 dataset includes data collected between 1995 and 1995 – 1999 and the 2010 dataset includes data collected between 2005 – 2013. Difference between 1995 and 2011 bathyemetry surveys were used when available. Outside the coverage of the 2011 bathymetry data, differences between 1995 and 2007 bathymetry surveys were used.

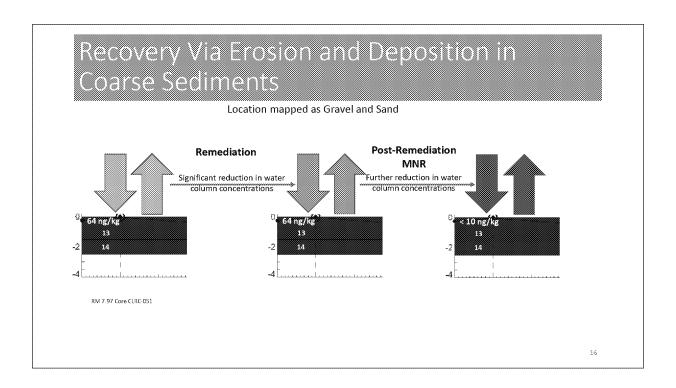
13

Knowledge of Recovery Mechanisms Allows Prediction of Post-Remediation Recovery

- \* Burial via net deposition
  - Applies to most areas with surface sediment
    2,3,7,8-TCDD concentrations in the range of
    200 to 400 ng/kg
- \* Exchange of fine sediment component of coarse sediments via alternating deposition and erosion
  - Applies to areas with surface sediment 2,3,7,8-TCDD concentrations less than 200 ng/kg

34





Recovery
Potential at
Locations with
2,3,7,8-TCDD of
200 ng/kg to 300
ng/kg was
Evaluated to
Validate
Recovery
Mechanisms

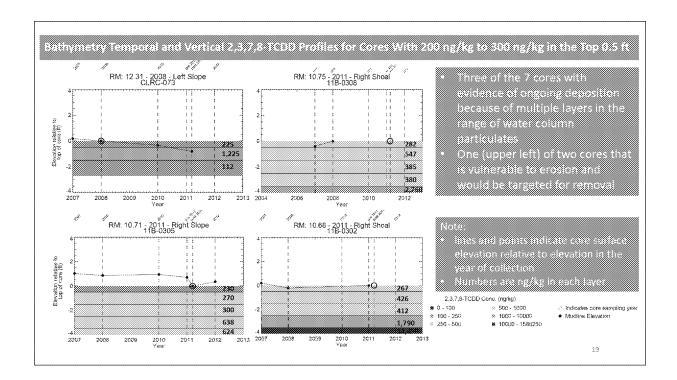
- \*12 such cores collected between RM 8 and RM 12.5
- Indicators of recovery potential
  - More than one layer with concentrations in the 200 ng/kg to 400 ng/kg range indicative of deposition
  - \* No indication of significant erosion at the location
    - Recognizing that Hurricane Irene occurred in 2011 (90 year event)
  - Absence of subsurface contamination location of temporary deposition

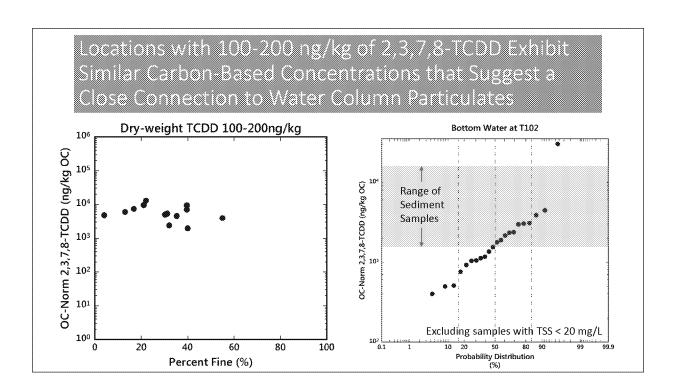
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Results of Evaluation Support (or Validate) Recovery and Phase 1 IR

- \* Summary of findings
  - · 10 of 12 locations show recovery potential
    - 7 locations have more than one layer with concentrations in the 200 ng/kg to 400 ng/kg range
    - 2 locations have higher concentrations below the surface layer but only modest bathy changes despite high flow events
    - $^{\circ}$  1 location has no subsurface contamination temporary deposition
  - 2 locations would be remediated in Phase 1 based on vulnerability to erosion
- Recovery despite unusually frequent high-flow events that would tend to mask longer term recovery potential
- recovery potential
  2007-2011 included 4 events with peak daily average flow of about 15,000 cfs or more at Little Falls
  - Only one such event in the prior 27 years

2.83

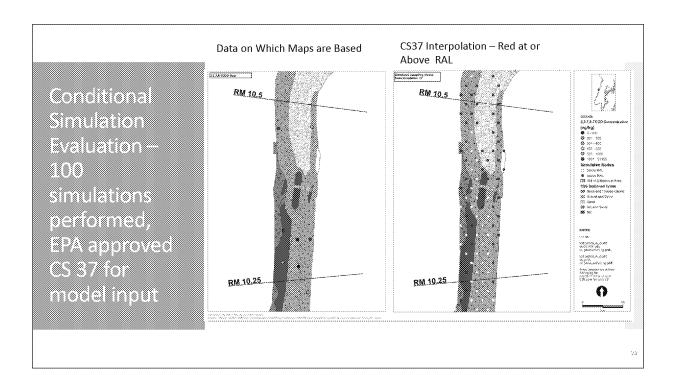




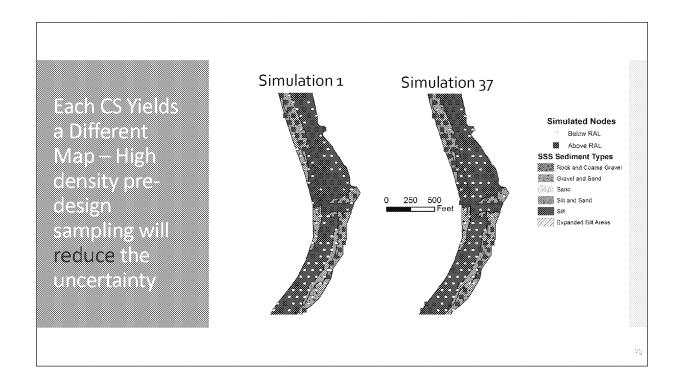
Evaluation of Remediation and its Effectiveness Conducted Using Concentration Distributions Predicted by Geostatistics

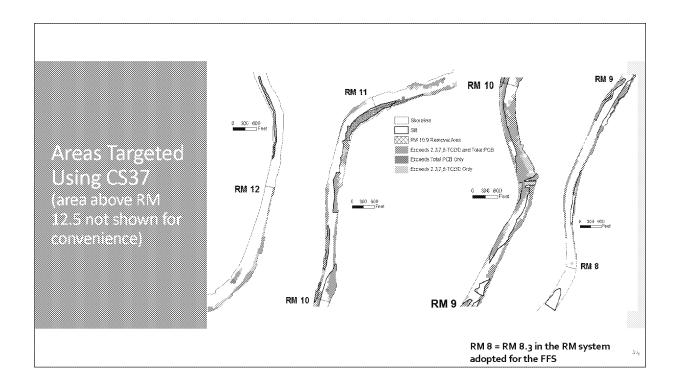
- Kriging used to quantify uncertainty in interpolated concentrations
- Conditional simulation used Kriging uncertainty estimates to generate 100 maps of sediment COPC distributions, each of which honor the data and the spatial correlation estimated from the data
- A single map designated as CS37 has been agreed for modeling purposes to be used to estimate the magnitude of remedial foot print triggered by the RALs and the concentration reductions that would be attained by that remediation

3.3



This plot highlights the uncertainty of the mapping in that it interpolates far from measured concentrations.





This delineation gives a sense of where remediation would likely occur, but cannot be viewed as where delineation will occur. It is useful for assessing scope and relative effectiveness.

		2,3,7,8-1CD	) RAL (ng/kg)		RM 8-14	I.7 Acreage
	Limited Deposition/ Same Erosian	Erosion > 6 inches	Direct Contact Areas	Other Areas	CS 37	Range of All CS Runs
	300	300	300	300	83	67 - 94
	250	250	300	300	84	70 - 96
	200	200	300	300	86	72 - 99
	200	200	300	500	84	71 - 97
	200	200	250	500	85	72 - 98
	200	200	200	300	89	75 - 102
LHOOMATINE Jased on	2,3,7,8-7	CDD BAL (ng/k	ı	RM 8-14.7 Acre	ete	
/arriable RALs	Shoals	Erosion > 6 inches	Other Areas		nge of All S Runs	
	200	300	300	87 7	73 - 99	
	200	200	300	87 7	3 - 100	
	200	200	500	85 7	71 - 96	

Reducing the 2,3,7,8-TCDD RAL to 250 or 200 ng/g does not provide much additional benefit.

		IA: (ng/kg)		2,3,7	.8-TCDD	Tet	al PCB	2,3,7,	8-TCDD	Tot	al PCB
Limited Deposition/ Some Erasion	Erasion > 6 inches	Direct Contact Areas	Other Areas	SWAC	Percent Reduction	SWAC	Percent Reduction	SWAC	Percent Reduction	SWAC	Percent Reductio
300	300	300	300	84	91.5	0.30	79.7	62	91.5	0.29	74.7
250	250	300	300	82	91.7	0.30	80.0	60	91.7	0.29	75.0
200	200	300	300	79	92.0	0.29	80.4	62	91.5	0.29	74.7
200	200	300	500	87	91.2	0.30	79.8	64	91.2	0.29	74.8
200	200	250	500	82	91.7	0.29	80.2	60	91.7	0.29	75.2
200	200	200	300	71	92.8	0.28	81.2	52	92.8	0.28	76.2
23,787	CDD RAL (n	g/kg)	2,3,7,8	RM B	- 14.7 Total P	СВ	2,3,7,8-10	RM 8 - 1	7.4 Total PC8		
Shoals	Erosion > 6 inches	Other Areas	SWAC	Percent Reduction		Percent eduction		ercent duction		rcent uction	
200	300	300	70	92.9	0.28	81.1	52	92.9	0.28 7	6.0	
200	200	300	70	92.9	0.28	81.1	51	92.9	0.28 7	6.1	
200	200	500	74	92.6	0.29	80.6	54	92.6	0.28 7	5.6	
All PC	B res	ults a	are b	elow	ROD	back	groun	d of	>0.4 r	ng/k	g

Reducing the 2,3,7,8-TCDD RAL to 250 or 200 ng/g does not provide much additional benefit.

Variable RAL Analysis Found No Significant Difference Between Alternatives

- \* Analysis Supports Use of 300 ng/kg RAL
  - \* 300 ng/kg RAL reduces concentrations more than ten-fold
  - Reducing RAL to 200 ng/kg in areas with certain characteristics achieves little additional benefit
    - Targets cores showing recovery potential
    - Produces unmeasurable changes in SWAC
      - · mostly < 10 ng/kg
  - 300 ng/kg RAL is already conservative
    - Could raise to 400 ng/kg since water column concentrations 200 – 400 ng/kg

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Current RI
Data Limit the
Ability of
Identifying
Flexible RALs

- \* Current RI data is insufficient to demonstrate the benefits of flexible RAL approach
- \* Flexible RAL options do little to reduce risk, but the increase in volume and cost are significant.
- \* PDI investigation will be designed to develop data set to improve models and allow a more robust evaluation of flexible RALs.
- Models suffice for FS level evaluation

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Range of Post-Remediation SWACs Within Range of Data Uncertainties

- \* CS 37 is One of 100 Conditional Simulations
  - \* +/-25% for total footprint acreage
  - · Final footprint will be based on PDI results
- Current data set and tools are not refined sufficiently to determine the difference between 40, 30, 20 or 10 ng/kg
- Numerous Uncertainties in Sediment to Tissue Relationships
- Post-Remediation/Recovery SWACs are equivalent within accuracy of data
- Only mechanism to evaluate effectiveness is to conduct Phase 1 Interim Remedy and monitor: Adaptive Management

25.5

EPA Evaluated Potential Recovery Following Phase 1 IR & MNR in 2038

## HDR Prediction Results - September 11, 2017

- RM8.3 17.4
  - \* 2038 TCDD concentration (after recovery): 27 ng/kg
  - · 96% reduction
- · RM8.3 14.8
  - \* 2038 TCDD concentration: 36 ng/kg
  - · 96% reduction
- Shoals, RM8.3 14.8 and RM8.3 17.8
  - \* 2038 TCDD concentration: 31 ng/kg
  - 97.5% reduction
- Results show that the Phase 1 removal is likely to provide a substantial benefit to the river
- Supports projections that the Phase 1 IR and subsequent MNR are expected to be protective

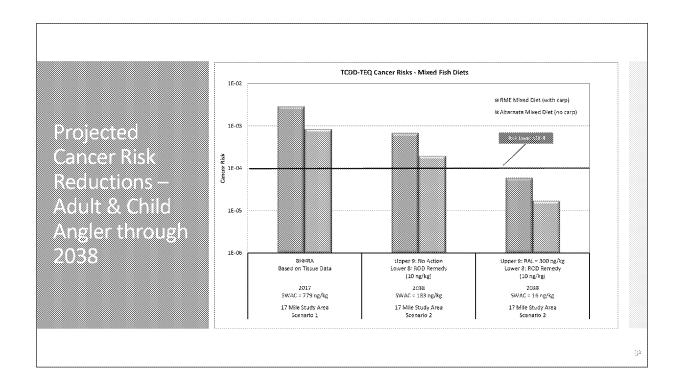
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Charles Constitution		bear (or State Used
Current baseline conditions	779 ng/kg RM 0-17.4 SWAC	CPG Mapping of "2010" dataset (conditional simulation 37)
ROD remedy only (no action in the upper 9 miles)	183 ng/kg RM 0-17.4 SWAC	Area-weighted average of the following:  For lower 8 miles, EPA ROD model prediction for 2038 for preferred remedy, based on 2016 ROD report figures (10 ng/kg).  For upper 9 miles, EPA ROD model No Action simulation presented at the 9/11 Phase 1 meeting (511 ng/kg)
ROD remedy and Phase 1 IR & MNR - Impact on site-wide risk	16 ng/kg RM 0-17.4 SWAC	Area-weighted average of the following: For lower 8 miles, EPA ROD model prediction for 2038 for preferred remedy, based on 2016 ROD report figures (10 ng/kg). For upper 9 miles, EPA ROD model 2038 prediction for a 300 ng/kg 2,3,7,8-TCDD RAL in the upper river, presented at the 9/11 meeting (27 ng/kg)

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This figure shows the projected reduction in site-wide dioxin fish consumption cancer risk from implementing the Lower 8 Miles ROD remedy and the Phase I interim remedy for the Upper 9 Miles. The risks were calculated using the reasonable maximum exposure assumptions for the angler from the final baseline human health risk assessment.

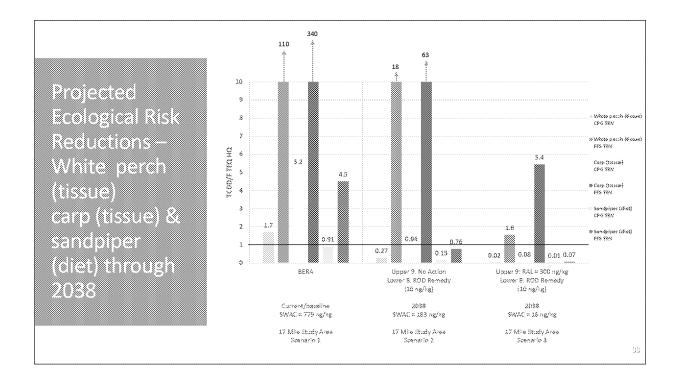
Scenario 1 shows current site-wide risks for a mixed fish species diet with or without carp. The fish consumption risks of  $3 \times 10^{-3}$  (with carp) and  $8 \times 10^{-4}$  (no carp) are based on the fish tissue data collected during the RI.

Scenario 2 shows projected post-remedy risks at Year 2038 for the 17-mile Study Area after implementing the Lower 8 miles ROD remedy. The analysis assumes a proportional relationship between sediment and fish tissue concentrations. Dioxin risks are reduced by 77% from current risks, but still exceed the NCP target risk of 10-4.

Scenario 3 shows projected post-remedy risks at Year 2038 for the 17-mile Study Area after implementing the Lower 8 Miles ROD remedy and the Upper 9 Miles interim remedy. Dioxin risks are reduced by 98% and are below the NCP target risk of 10-4.

Other exposure pathways (direct contact with sediment and surface water) are minor contributors to cumulative site risk, and post-remedy risk would still be below 10-4 if these potential exposure pathways are included.

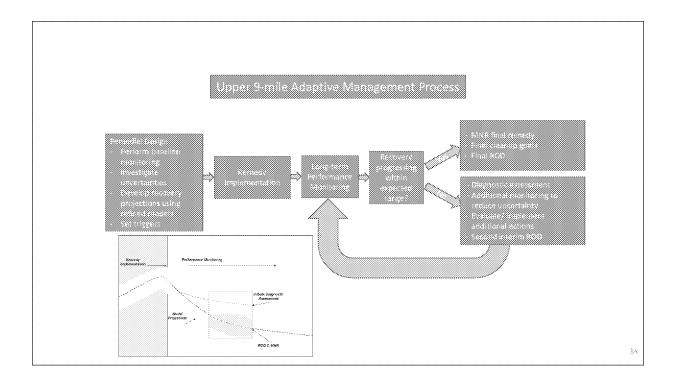
The above estimates reflect mixed fish species exposed to a whole-river sediment average; they will be revised to reflect the exposure likely from the species specific home range when the models are finalized.



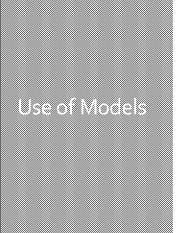
For Scenario 2, HQs were reduced by 84% for white perch (tissue), 82% for carp (tissue), and 83% for sandpiper (diet). HQs were < 1 for Scenario 2, with the exception of white perch (HQ = 18) and carp (HQ = 63) using FFS TRVs.

For Scenario 3, HQs were reduced by 99% for white perch (tissue), 98% for carp (tissue), and 99% for sandpiper (diet). HQs were < 1 for Scenario 3, with the exception of white perch (1.6) and carp (5.4) using FFS TRVs.

The above estimates reflect ecological receptors exposed to a whole-river sediment average; they will be revised to reflect the exposure likely from the species specific home range when the models are finalized.



This is a summary of the adaptive management process. During the RD, model projections will be refined based on the baseline and PDI data. Triggers for additional assessment will be defined based on the refined model projections, and will include an expected range of recovery to account for uncertainty in the projections. If the remedy progresses as expected, final clean up goals will be established and a final ROD will be issued. If the remedy is not progressing within the expected range, additional assessment and actions will be performed, as appropriate, and a second interim ROD will be released.



- Complete current modeling effort to support FS
  - · Hydrodynamic/Sediment Transport Calibrated
  - Chemical Fate & Transport Calibration Nearing Completion
  - Bioaccumulation Calibrate & Peer Review in 2018
- \* Use additional data collected in PDI to refine Contaminant Fate and Bioaccumulation models
- Develop expected recovery trajectory and use Performance Monitoring data to assess if river is responding as predicted

3

Slide Text

Monitoring Elements of Phase 1 Adaptive Management

# Baseline monitoring

 Establish pre-dredge conditions for comparison with postremediation conditions

# Pre-Design Investigation (PDI)

- · Delineate remedial footprint
- Support model refinement and updated recovery projections

# Performance monitoring

- Interim monitoring to evaluate short-term system response during remedy implementation
- Long-term monitoring of system response to support 5-year reviews, and adaptive management

38

These are the monitoring elements that will provide data specifically to support the adaptive management evaluations (i.e., construction monitoring and cap performance monitoring are not included in the adaptive management presentation but will be part of the complete monitoring program). Monitoring programs will be designed with clearly articulated data use objectives to ensure that data are collected with sufficient temporal and spatial resolution to monitor remedy performance.

# Adaptive Management Approach

- Criteria and triggers for diagnostic assessment and/or additional action will be based on comparison of performance monitoring data with projected recovery rates
- If the diagnostic assessment identifies:
  - Lack of recovery due to identifiable factors additional remedial actions will be evaluated/selected
  - Slower than projected but ongoing recovery revisit CSM and/or model projections, re-evaluate risk reduction timeframes, continue monitoring or consider additional actions

#### Diagnostic measures could include:

- Increased monitoring frequency to confirm conditions of concern
- Focused sampling to isolate area(s) of concern
- · Bathymetric evaluation
- · Model recalibration
- · CSM refinement
- Source identification

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The monitoring plan to support adaptive management will be developed during the remedial design. The plan will include projections of risk reduction and associated time frames. Post-remedy monitoring data will be compared to projections and defined triggers to assess recovery progress. If triggered, a diagnostic assessment will be performed with additional data collection and/or evaluations to understand why recovery is not proceeding as anticipated. If the diagnostic assessment concludes that additional remedial actions are needed to achieve risk reduction goals, a focused feasibility study or other evaluation will be performed to identify an evaluate additional actions.

Adaptive Vanagement - Preliminary	Reduce tissue concentrations in fish and crab	<ul> <li>Baseline and long-term tissue monitoring</li> </ul>	Tissue recovery rates are slower than the projected range Tissue concentrations reach a plateau that will not achieve adequate risk reduction	Confirmatory tissue sampling Diagnostic sediment and water column monitoring Source investigation CFT/FWM model recalibration Evaluation/selection of additional source control or in-water actions
Tentinially Metrics, Figgers, and Responses	Reduce COC concentrations on water column solids depositing in the upper 9 miles	Baseline and long-term water column monitoring	Water column solids COC concentration recoveries are less than the projected range	Focused water column monitoring to identify areas of concern     HST/CFT model recalibration     Evaluation/selection of additional source control or in-water actions
	Prevent re-exposure of subsurface sediment with COC concentrations >> RALs in uncapped areas	Baseline and post- construction bathymetry     Future bathymetric surveys in response to high-flow events	Bathymetry data indicate erosion and re-exposure of buried contamination	Sediment sampling in potentially eroded/exposed areas     Evaluation/selection of additional actions

A well-defined set of metrics, triggers, and response actions will support the adaptive management approach. The set of remedy objectives/performance standards are based on the CSM for the upper 9-miles; specifically, they are derived from the current understanding of how recovery is expected to occur following remedial actions. For each objective/performance standard, one or more monitoring metrics and triggers will be defined. Numerical values for each trigger will be specified. Depending on the results of the monitoring and which values are triggered, one or more response actions will be performed.

Potential Monitoring in the Upper 9	Year 0 I Constru Long-	y nentation Post	Bathymetry V V	Water Column v v v	Elota V V V V	Sediment (Recovery Indicator Acces)  V**
Miles	term		onents are those ide npling will be perfor	<b>y</b> ntified as triggering me med in PDI	√	<b>v</b>

The components of the monitoring will be deployed to achieve the specified data use objectives of the adaptive management plan. Specifically, the primary monitoring components will be performed on a defined schedule (water column and biota) and/or by a defined event (bathymetry following a high flow event). The frequency and spatial coverage will be sufficient to monitor remedy performance and identify significant deviations from expected performance. The diagnostic components will be performed as needed.

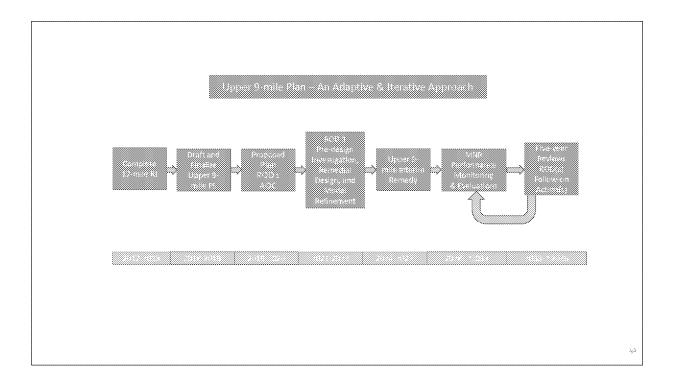
Sediment Recovery Indicator Areas (RIAs) will be identified for sediment sampling, both within and outside of active remediation areas, where there is an expectation of response based on the CSM (e.g., depositional and net neutral areas). Incremental sampling will be performed within the RIAs to support characterization of temporal changes in surficial sediment concentrations.

	Bathymetry/ Side Scan Sonar	<ul><li>Update bathymetry (including relevant shallow areas)</li><li>Update and refine grain size distribution map</li></ul>
seline Ionitoring	Water Column	<ul> <li>Characterize solids and COC fluxes into and out of the upper 9 mile reach</li> <li>Characterize water column COC concentrations within the reach</li> </ul>
ajactives	Biota	Characterize chemical concentrations in fish and crab     Understand potential for biota recovery     Initiate trend analysis in biota over time

Data use objectives for the monitoring program will be clearly articulated so that the appropriate data collection is performed. Baseline data, which will be collected over multiple years, will provide an updated characterization of the upper 9 miles. Sediments will be sampled as part of the PDI, and will support any baseline needs.

	Bathymetry	Confirm sediment stability
	Water Column	Monitor solids concentration recovery and flux reduction
one Term	Biota	Monitor recovery trends
Performance Monitoring Objectives	Sediments (RIAs)	Support diagnostic assessment if slow tissue recovery is observed; Characterize post-remedy surficial sediment concentrations to support sediment stability assessment

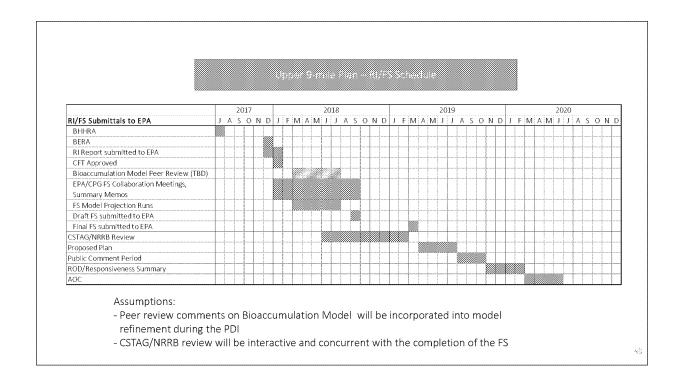
Long-term performance monitoring data will be used to assess remedy performance, and, if necessary, evaluate deviations from expected performance.



# Overview of schedule.

# General assumptions:

- Estimated RA time assumes proposed remedy (~80 acres)
- Collaborative meetings with EPA and CPG to discuss and resolve key FS issues and to streamline the FS memo process.
- Proposed Plan can be drafted concurrently with the completion of the FS to expedite release.



Collaboration between EPA and CPG will result in expedited deliverables and revisions leading to approvable documents, and support release of the Proposed Plan soon after the completion of the FS.

CPG proposes periodic briefings with NRRB/CSTAG during the FS to address concerns and incorporate documents during the completion of the FS.

2017   2018   2019   2020   2021   2022   2023   2024   2025   2026   2027   2028   2029   2030   2031   2032   2033   2034   2035   2088   2019   2020   2021   2022   2023   2024   2025   2026   2027   2028   2029   2030   2031   2032   2033   2034   2035   2038   2039   2030   2031   2032   2033   2034   2035   2033   2034   2035   2036   2036   2036   2036   2036   2036   2037   2038																							
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Remedy Implementation Monitoring		Remedy Implementation Monitoring																					
Long-term Performance Monitoring		Long-term Performance Monitoring																					
5-yr Reviews (Diamond Alkali Site-wide)		5-yr Reviews (Diamond Alkali Site-wide)																					
Second ROD (approximate time frame)		Second ROD (approximate time frame)																					
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	risk - Confirm tissue recovery	- Confirm contaminant	t migra	tion i	is re	duce	d			- Co	nfirn	n sec	dime	nt st	abili	ty							
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<ul> <li>Confirm direct contact and ecological risk</li> <li>Confirm tissue recovery</li> <li>Confirm water column solids recovery</li> <li>Confirm contaminant migration is reduced</li> <li>Confirm sediment stability</li> </ul>	risk - Confirm tissue recovery - Confirm water column solids recovery			cove	ı y																		
<ul> <li>Confirm direct contact and ecological risk</li> <li>reduction is achieved</li> <li>Confirm water column solids recovery</li> <li>Confirm contaminant migration is reduced</li> <li>Characterize initial tissue recovery</li> </ul>	risk - Confirm tissue recovery - Confirm water column solids recovery	•																					
<ul> <li>Confirm direct contact and ecological risk reduction is achieved</li> <li>Confirm water column solids recovery</li> <li>Confirm contaminant migration is reduced</li> <li>Characterize initial tissue recovery</li> <li>Verify sediment stability</li> </ul>	risk - Confirm tissue recovery - Confirm water column solids recovery	- Identify any major de	eviation	is fro	m IF	₹																	

Duration of PDI/RD and RA estimated.

performance expectations

Timing of RD and RA allows for coordination with lower 8-mile remedy (based on available information on lower 8-mile remedy schedule)

It is anticipated that major deviations from remedy performance expectations will be evident in the initial years of long-term monitoring.

The timing of the second ROD will depend on the results of the monitoring. If recovery is proceeding as expected, the second ROD will be the final ROD, and include numeric PRGs.

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## 2005 Sediment Guidance

- Take other early or interim actions, followed by monitoring before deciding on a final remedy
- Use adaptive management at complex sediment sites...test hypotheses, reevaluating assumptions as new information is gathered
- Phase in remedy selection where F&T is not well understood or there are significant implementation issues
- Consider separating management of source area from other areas

## 2017 OLEM Directive

- Consider early actions during RI/FS
- Develop achievable risk reduction expectations
- Consider the limitations of models
- Consider a structured adaptive management approach
- Use monitoring data to evaluate remedial effectiveness

## 2017 Superfund TF

- Strategy 2: Promote the application of adaptive management at complex sites and expedite cleanup through use of early/interim rods and removal actions
- Recommendation 3: Broaden the use of adaptive management (AM) at Superfund Sites

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Upper 9-Mile Interim Remedy is consistent EPA Guidance and Directives

CPG's Proposal for an Upper 9-Mile Phase 1 IR

- Phased approach to address the Upper 9-Miles using Adaptive Management
- \* Proposed RAL of 300 ppt (ng/kg) TCDD and 1 ppm (mg/kg) of Total PCBs
- \* Approximately 80 Acres from RM 8.3 to RM 14.7
- \* Remedial Footprint will be reassessed after the PDI
- Performance Monitoring will be used to determine whether the Phase 1 IR and MNR are sufficient and ROD 2 can codify the final cleanup levels, or whether additional actions are required to achieve protectiveness

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The Adaptive
Remedy is
Scientifically
Supported and
Certain to be
Protective

# · Certain:

- Immediately reduces contaminant levels by an order of magnitude
- Human Health & Ecological risks significantly & quickly reduced
- Recovery will be accelerated

## Expected

 Meeting the goal of overall protectiveness by the late 2030s for the 17-mile LPRSA.

#### Certain

- Post remediation monitoring will provide data needed to confirm recovery
- \* If additional remediation is needed more will be done

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